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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/047,688      | 01/15/2002  | Z. Valy Vardeny      | UTU-10002/29        | 3863             |

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03/01/2004

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| EXAMINER |
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| ART UNIT | PAPER NUMBER |
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1774

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

54

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|------------------------------|---------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/047,688  | <b>Applicant(s)</b><br>VARDENY ET AL. |  |
|                              | <b>Examiner</b><br>Marie R. Yamnitzky | <b>Art Unit</b><br>1774               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 3,4,6-8,12,15-17 and 21-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,9-11,13,14 and 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date rec'd 08 May 2002 and 26 Aug 2002.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 1774

1. Applicants' election without traverse of Group I, claims 1-11 and 13-20, and the species (b)(i) in responses filed October 24, 2003 and December 03, 2003 is acknowledged. Applicants do not traverse the restriction and election of species requirements.

In electing species (b)(i), applicants do not indicate which claims read on the elected species. In the election of species as originally set forth in the restriction/election requirement mailed September 30, 2003, the examiner set forth a method in which an impurity is added to a light-emitting material to increase spin-lattice relaxation rate of carriers as being a species patentably distinct from a method in which an impurity is added to a luminescent material to increase the spin flip rate of carriers. However, upon further consideration of the specification, it is the examiner's understanding that a method of increasing spin-lattice relaxation rate by adding an impurity is a subset of a method of increasing the spin flip rate of carriers by adding an impurity. With this understanding, claims 1, 2, 5, 9-11, 13, 14 and 18-20 read on the elected species.

2. Claims 3, 4, 6-8 and 15-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected species, there being no allowable generic or linking claim. Election of species was made **without** traverse in applicants' response filed December 03, 2003.

Claims 12 and 21-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election of invention was made **without** traverse in applicants' response filed October 24, 2003.

Art Unit: 1774

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, or are listed on one of the two forms PTO-A820/PTO-1449 submitted by applicants, they have not been considered.

4. Claims 13, 14 and 18-20 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Claims which fail to recite features that are critical or essential to the practice of the invention are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

In the present case, it is critical/essential that the light-emitting material to which the impurity is added be a material that is a singlet-emissive material (though note the following rejection under 35 U.S.C. 112, second paragraph, regarding the questionable scope of singlet-emissive materials).

It is also critical/essential that the light-emitting material to which the impurity is added be a material having a singlet-triplet cross-section ratio greater than unity.

5. Claims 1, 2, 5 and 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1774

The scope of luminescent materials having an emissive singlet recombination channel and a non-emissive triplet recombination channel is not clear in light of the specification which teaches that singlet-emissive devices include phosphorescence based light emitting devices (e.g. see page 4, lines 14-20, p. 11, l. 5-10 and the abstract). It is not clear how a phosphorescence based light emitting material/device can be considered to be a singlet-emissive material/device.

Claims 9-11 are also indefinite because there is no antecedent basis for "the impurity" as recited in these claims as dependent from claim 1. The examiner suggests amending claims 9-11 to depend from claim 2.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 5, 9-11, 13, 14 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Garnier et al. (5,272,238).

Garnier et al. disclose incorporating a metallocene such as ferrocene into a polymer chain. Metallocenes such as ferrocenes provide an impurity meeting the limitations of present claims 9-11 and 18-20. Although Garnier et al. do not explicitly disclose the polymer as a

Art Unit: 1774

luminescent polymer,  $(R^{11})_m$  as defined for Garnier's formulae (II) and (III) provide for various known luminescent polymers such as polyphenylene, polythiophene and polypyrrole.

8. Claims 1, 2, 9, 10, 13, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (US 6,312,835 B1).

Wang et al. disclose enhancing the luminescence efficiency of organic chromophores by combining an aluminum ion with ligands formed by the organic chromophores. For example, see column 5, lines 29-61 and c. 7, l. 24-51. Aluminum is paramagnetic, thus meeting the limitations of the impurity as required by present claims 9, 10, 18 and 19.

9. Claims 1, 2, 5, 11, 13, 14 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al. (US 2002/0076576 A1).

Li et al. disclose enhancing the luminescence efficiency of luminescent materials such as PPV by including deuterated hydrogen atoms in the polymer structure. Based on the prior art teachings, it is reasonable to expect that the deuterated hydrogen atoms facilitate low-frequency vibrations as required by present claims 11 and 20. See the whole published application, especially paragraphs [0007]-[0009] and [0025]-[0030].

10. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Epstein et al. (US 6,621,100 B2).

Art Unit: 1774

Epstein et al. disclose enhancing the performance of a polymeric luminescent material such as PPV by applying a magnetic field.

11. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

Forrest et al. (US 6,310,360 B1) improve efficiency of a singlet-emissive (fluorescent) material by doping with an intersystem crossing agent such as the iridium complex Ir(ppy)<sub>3</sub>.

12. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for Art Unit 1774 is (703) 872-9306 for all official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
February 23, 2004



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774